Determination of pond water quality for aquaculture and ecosystem management

ABSTRACT

Fish is the main source of animal protein for the common people of Bangladesh. About 37% of the inland fishes are obtained from the closed water fish culture where ponds play vital roles in the production system. The present study was carried out to determine the water quality (physico-chemical and biological factors) of five uncultivated or under cultivated ponds in the Chittagong University campus, Bangladesh, for aquaculture and ecosystem management. Temperature, pH, EC, BOD, COD, TSS, turbidity, NO2-, PO4 -, free CO2, CO3 -, HCO3-, Cl-, total viable bacterial count and total coliform were determined. Isolation and identification of Escherichia coli and Salmonella sp. from the water samples were performed to investigate the antibiotic sensitivity. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) against ciprofloxacin was also investigated. The findings reveal that there was no significant difference in temperature (19°C to 20°C), pH (6.7 to 7.4), electrical conductivity and Cl- values in the water among the ponds and that was within the range of the requirements for the fish cultivation. Both turbidity and total dissolved solids was highest in the uncultivated botanical garden pond 2 (BGP2). BOD, COD, NO2- , PO 4-2, HCO3-, and free CO2 concentration was beyond the permissible limits for aquaculture. Total viable count and total coliform ranged from 1.3 × 10 4 to 6.6 × 10 5 cfu ml-1 and from 0.0205×10 2 to 1.10×10 2 ml-1 respectively, among the ponds where both these parameters were highest in the naturally polluted BGP2. Most of the isolated E. coli and Salmonella sp. were sensitive but few showed resistance against the antibiotics, especially in BGP1, where fishes were cultivated commercially.

Keyword: Aquaculture; Ecosystem management; Water quality; Physico-chemical property; Total bacterial count